

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated October 7, 2003.

In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

The Office Action acknowledged the non-receipt of the Priority documents filed on April 19, 2002. Applicants hereby attached a copy of the priority documents as well as the stamped receipt by the Patent office. Applicants respectfully request the Examiner to trace the documents and indicate the status in the next office action.

Status of the Claims

Claims 1-3, 5-20, and 22-52 are under consideration in this application. Claims 4 and 21 are being cancelled without prejudice or disclaimer. Claims 1-3, 5-20, and 22-52 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention.

Additional Amendments

Claims 1-3, 5-20, and 22-52 are being amended to correct formal errors and/or to better recite or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formality Rejections

Claims 1-52 were rejected under 35 U.S.C. § 112, second paragraph, for inconsistent terminology used in the claims and terminologies lacking antecedent basis. As indicated, the claims have been amended as required by the Examiner. Accordingly, the withdrawal of the outstanding informality rejection is in order, and is therefore respectfully solicited.

Allowable Subject Matters

Claims 4, 6, 7, 11, 13, 14-46, 49 and 50-52 would be allowable if they are rewritten to overcome the 35 U.S.C. § 112 rejection. As indicated, with the claims being amended to overcome the 35 U.S.C. § 112 rejection, the claims thus are in condition for allowance.

Prior Art Rejections

Claims 1-3, 5, 8-10, 12, 31, 32, 47 and 48 were rejected under 35 U.S.C. § 102(b) on the grounds of being anticipated by U.S. Pat. No. 3,211,368 to Shanley (hereinafter “Shanley”). The prior art references of Gerken et al. (5,538,493), Mitsumaki et al. (5,104,807) and Drucker (3,199,775) were cited as being pertinent to the present application. This rejection has been carefully considered, but is most respectfully traversed.

The centrifugal separator of the invention (e.g., Figs. 1-6), comprises: a centrifugal rotor (e.g., 10-1, 10-2, 80-1, or 80-2) with a symmetric rotation axis, having a single sample separation chamber disposed therein (e.g., 2, 15, or 70), for centrifuging a sample contained in a sample solution placed in the sample separation chamber 2, and an upper opening 3 communicating with to said sample separation chamber 2 at an upper part of the centrifugal rotor, said rotation axis Z included inside said separation chamber 2 (Figs. 1, 3, 5, 6, 7, 12, 17and 18); a member 100 selectively engaged with said upper opening 3; and rotation-driving means 20 for rotating said centrifugal rotor 10-1, by means of said member 100 around said rotation axis Z in a first direction (Z). As now recited in **claim 1**, each of a second direction and a third direction intersects with said first direction at a right angle, a dimension of said sample separation chamber 2 in said third direction (Y) is larger than a dimension of said sample separation chamber 2 in said second direction (X). As now recited in **claim 8**, a direction normal to said axis Z and along which said sample chamber has the largest dimension thereof defines an axis Y, and a direction intersecting with said axis Z and axis Y axis at right angles defines an axis X. a cross sectional area of said sample separation chamber on a ZX plane is bigger than a parallel cross sectional area of said sample separation chamber away from said ZX plane.

The invention, as recited in **Claim 19** and **Claim 25**, is also directed to a centrifugal separator as recited in claim 1 and claim 8 respectively with an solution holding vessel (e.g., 12, 150) fixed in said sample separation chamber and having a concave portion (e.g., 13, 160) for holding said sample solution injected into said sample separation chamber via said upper opening. Both of the upper and lower openings communicating with said sample separation chamber.

The invention, as recited in **Claim 15**, is further directed to a centrifugal separator comprising: a centrifugal rotor (e.g., 10-1, 10-2), with a symmetric rotation axis Z, having a single sample separation chamber (e.g., 5, 70) disposed therein for centrifuging a sample contained in a sample solution, an upper opening 3 communicating with said sample separation chamber at an upper part of the centrifugal rotor and a lower opening 16 communicating with said sample separation chamber, said symmetric rotation axis of said rotor included inside said separation chamber; rotation driving means 20 for rotating the centrifugal rotor by rotating said upper part (e.g., 110-2 in Fig. 6) around said rotation axis Z; and a solution holding vessels (e.g., 2, 150), fixed in said sample separation chamber and having a concave portions (e.g., 13, 160) for holding said sample solution injected into said sample separation chamber via the upper opening. **Claim 17** further recites that a direction normal to said axis Z and along which said sample chamber has the largest dimension thereof defines an axis Y, and a direction intersecting with said axis Z and axis Y at right angles defines an axis X, and a longitudinal direction of the solution vessel coincides with said axis Y.

Claims 47-48 recites only the centrifugal rotor of the above-mentioned centrifugal separator recited in claims 1 and 8. **Claim 49** recites only the centrifugal rotor and the solution holding vessel of the above-mentioned centrifugal separator recited in claim 19. **Claims 50 and 51** further recites a wherein paragraph as recited in claim 8 and claim 1 respectively, in addition to the language of claim 49. **Claim 52** mirrors claim 50 and further recites that both of the upper and lower openings communicate with the sample separation chamber.

The invention (Figs. 19-21) as recited in **Claim 31** is further direct to a sample preparation device comprising: a plurality of centrifugal rotors (e.g., 210, 501) for centrifuging a sample contained in a sample solution, each having a respective symmetric rotation axis, a single sample separation chamber (e.g., 2, 15, 70) disposed therein, and an upper opening 3 communicating with said sample separation chamber, said rotation symmetric axis being included inside said sample separation chamber; a plurality of rotation driving means (e.g., 211, 502) each for rotating a respective one of said centrifugal rotors around said respective symmetric rotation axis; and control means for independently driving said rotation driving means of said respective rotor. **Claim 37** further recites that an upper opening 3 communicating with said sample separation chamber at an upper part of each rotor, and a lower opening 16 communicating with said sample separation chamber at a lower part of each rotor, and that a plurality of solution vessels (e.g., 12, 150) each being fixed said sample separation chamber and having a concave portions (e.g., 13, 160) for holding said sample solution injected into said sample separation chamber via said upper opening.

The invention as recited in **claim 43** is further directed to a method for preparing at least one sample with a plurality of centrifugal rotors (e.g., 210, 501) each having a single sample separation chamber (e.g., 2, 15, 70) therein for centrifuging a sample contained in a sample solution, an upper opening communicating with said sample separation chamber, each of said rotors having a respective symmetric rotation axis included inside said sample separation chamber, said method comprising: injecting said sample solution into said sample separation chamber of each of said centrifugal rotors; moving each of said centrifugal rotors along a loop-shape trajectory; centrifuging said sample solution by rotating said centrifugal rotors independently around said respective symmetric rotation axis; and recovering said sample obtained by centrifugation from each of said sample separation chambers of said centrifugal rotors. **Claim 45** further recites a lower opening communicating with said sample separation chamber at a lower part of a respective centrifugal rotor and at least one of solution holding vessels (e.g., 12, 150) fixed in said sample separation chamber each having a concave portions (e.g., 13, 160) in said sample separation chamber.

Claim 44 further specifies the centrifuging step of claim 43 into centrifuging said sample solution to produce a precipitate of said sample by independently rotating each of said centrifugal rotors around said respective symmetric rotation axis; and the recovering step of claim 43 into recovering said precipitate dissolved in said solvent from each of said sample separation chambers of said centrifugal rotors into at least one recovery vessel. Claim 44 further recites three new steps: discharging a supernatant liquid obtained by centrifugation of said sample solution in said sample separation chamber of each of said centrifugal rotors; cleaning away said precipitate deposited in said sample separation chamber of each of said centrifugal rotors; injecting a solvent into at least one of said sample separation chambers of said centrifugal rotors thereby dissolving said precipitate in said solvent. **Claim 46** further recites a lower opening communicating with said sample separation chamber at a lower part of a respective centrifugal rotor and at least one of solution holding vessels (e.g., 12, 150) fixed in said sample separation chamber each having a concave portions (e.g., 13, 160) in said sample separation chamber.

The constitution of the present invention provides each of the rotors with its own rotation axis. In other words, the sample separation chamber of the present invention includes the rotation axis within its sectional area.

Applicants respectfully contend that Shanley fails to teach or suggest such a centrifugal separator having each separation chamber 2 existing in one centrifugal rotor 10-1 and the symmetric rotation axis Z of the rotor 10-1 being included *inside* the separation chamber 2.

In contrast, Shanley has a plurality of separation chambers (compartments) 20 that exist in one rotor 40, and the rotation axis of the rotor 40 is located outside of the separation chambers 20 (Fig. 2). When a plurality of separation chambers (Figs. 19-21) are employed by the invention, the chambers 41 are rotated independently from each other. In contrast, Shanley has a plurality of separation chambers (compartments) 20 that exist in one rotor 40, and all chambers are rotated simultaneously (rather than independently).

In the present invention, precipitate is gathered at the end portions of the chamber 2 extending along its longest dimension in Y direction, and a supernatant gathers at the central portion (between the end portions) of the chamber 2 by virtue of centrifugal separation. As such, the supernatant can be easily drawn out from the chamber 2. In contrast, Shanley dose NOT separate precipitate and supernatant. Rather, the sample solution in Shanley is separated into a dense portion and a less dense portion, and the portions are communicated with a passageway or the like (claims 2 to 31 where a passageway for connecting compartments is provided). Mitsumaki, Druker, and Gerken fail to compensate for Shanley's deficiencies.

As such, the present invention as now claimed in independent claims 1, 8, 15, 19, 25, 31, 37, 43-52 is distinguishable and thereby allowable over the rejection raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

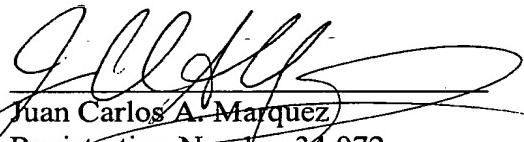
In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of

the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

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